PUMP DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention:

The present invention is related to a pump device and particularly to a pump device, which has a main body with an inlet, an outlet and a receiving space therein, a magnetizing device outside the main body and a magnetic device in the receiving space corresponding to the magnetizing device.

2. Brief Description of Related Art:

Taiwanese Patent Publication No. 520008 (Application No. 91200922), entitled "WATER PUMP STRUCTURE" discloses a water pump, which includes a motor, which is disposed in the water pump and has an outer casing integrally joined to and disposed in the pump, a shaft being disposed at a lateral side of the motor, a blade wheel being attached to the shaft. The shaft and the blade wheel are disposed in the pump and the motor is heat dissipated with water. The preceding prior art has the motor being received in the water pump and the blade wheel, which is connected to the motor, rotates to actuate the water flow. In order to prevent the motor from contacting the water, a water resistant device has to be added in the pump so that it increases the fabrication cost of the water pump. Further, the water resistant device may create clearances after being used a long period due to fatigue effect such that the water penetrates the motor via the clearance to result in damage of the motor. Moreover, the water pump has to provide a fluid passage in addition to receiving the motor so that a huge size is required and it makes the water pump impractical.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a pump device, which is actuated with a magnetic device to pump the liquid by way

of magnetic inductance.

Another object of the present invention is to provide a pump device, which isolates the fluid from the electrical device, for preventing the fluid from being conductive.

BRIEF DESCRIPTION OF THE DRAWINGS

The detail structure, the applied principle, the function and the effectiveness of the present invention can be more fully understood with reference to the following description and accompanying drawings, in which:

Fig. 1 is an exploded perspective view of a fan device according to the present invention;

Fig. 2 is an assembled perspective view of the fan device shown in Fig. 1;

Fig. 3 is a plan view of blade wheel rotor illustrating rotational direction thereof;

Fig. 4 is a sectional view of fluid in a state of flowing;

Fig. 5 is an exploded perspective view of a fan device according to the present invention in another embodiment thereof;

Fig. 6 is an assembled perspective view of the fan device shown in Fig. 5;

Fig. 7 is a sectional view illustrating of a magnetic movable spool in the pump device of the second embodiment moving backward; and

Fig. 8 is a sectional view illustrating of a magnetic movable spool in the pump device of the second embodiment moving forward.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A pump device of the present invention in a preferred embodiment thereof includes a main body 11, a magnetizing device and magnetic device.

Referring to Figs. 1 and 2, the main body 11 is composed of

non-magnetized material and the main body 11 has a receiving space 111 with an inlet 112 and an outlet 113 respectively disposed at two ends of the receiving space 111. A stator set 12 provides silicium steel plates 122 with coil sets 123 and has a through hole 121 corresponding to the main body 11 so that the stator set 12 can fit with the main body 11. The magnetic device is composed of a magnet 13, a blade wheel rotor 14 and annular bearings 15, 17. The blade wheel rotor 14 is fixedly attached with fan blades 141 and has an axial hole 142 for being rotationally pierced with a shaft 143. The blade wheel rotor 14 fits with a cylindrical shell 16 and each of the annular bearings 15, 17 is fixedly attached with spokes 152, 172 for fixing a bearing 153, 173 respectively. During assembling the pump device, the blade wheel rotor 14 is sleeved in the cylindrical shell 16 and the cylindrical shell 16 further is fitted in the magnet 13 such that the magnet 13, the cylindrical shell 16 and the blade wheel rotor 14 can be joined together. Then, the shaft 143 is arranged to pass through the axial hole 142 of the blade wheel rotor 14 and the assembly composed of the magnet 13, the cylindrical shell 16, the blade wheel rotor 14 and the shaft 143 with the annular bearings 15, 17 is received in the receiving space 111 in a way of both ends of the shaft 143 being rotationally attached with bearings 153, 173 of the annular bearings 15, 17 respectively so as to allow the magnet 13 keeping in a state of balance without colliding the inner wall surface of the receiving space 111. Next, the stator set 12 fits with the main body 11 and is disposed to correspond to the magnet 13 in the receiving space 111.

Referring to Figs. 3 and 4, when the current flows through the coil set 123, a magnetic field can be constituted and the silicium steel plates 122 are also induced a magnetic field. Once the magnet 13 occurs magnetic field effect with the silicium steel plates 122, the blade wheel rotor 14 can be driven to rotate in the receiving space 111. The fluid 18 can be sucked into the main body 11 via the

inlet 112 and drawn out from the outlet 113 via the receiving space 111 while the blade wheel rotor 14 rotates. Thus, the fluid 18 can be segregated from the electric apparatus completely to prevent the fluid 18 from contacting the electricity directly and occurring conductive effect. Further, the flow rate and flow speed of the fluid 18 can be increased to obtain maximum running efficiency as long as the blade wheel rotor 14 is actuated to a little running capacity.

Referring to Figs. 5 and 6, the pump device according to the present invention in another embodiment thereof is illustrated. The main body 21 is made of non-magnetized material and the main body 21 has a receiving space 211 with an inlet 212 and an outlet 213 being formed at each of two ends of the main body 21. A coil 22 has a coil spool 221 with a through hole 223 corresponding to the main body 21 so as to fit with the main body 21 and a lead wire 222 is coiled on the coil spool 221. The magnetic device is composed of a movable magnetic plunger 24 and annular bearings 25, 27. The magnetic plunger 24 is provided with a through hole 241 for being pierced by the shaft 242 and rotationally joining with the shaft 241. The annular bearings 25, 27 at the annular parts 251. 271 thereof are fixedly attached with secure ribs 252, 272 respectively for fixing the bearings 253. 273. During assembling the pump device, the shaft 242 is arranged to pass through and rotationally join with the through hole 241 of the movable magnetic plunger 24. Then, the assembly of the movable magnetic plunger 24 and the shaft 242 with the annular bearings 25, 27 is disposed in the receiving space 211 of the main body 21 in a way of the shaft 242 rotationally joining both ends thereof with the bearings 253, 273 of the annular bearings 25, 27 such that the movable magnet plunger 24 can move forward and backward along the shaft 242 between the annular bearings 25, 27 in the receiving space 211. Further, the coil 22 is sleeved in the main body 21 in a way of corresponding to the movable magnetic plunger 24.

Referring to Figs. 7 and 8, when the coil 22 is magnetized with the current to produce a magnetic field and to occur magnetic effect with the movable magnetic plunger 24, the movable magnetic plunger 24 can move forward and backward along the shaft 242 between the annular bearings 25, 27 in the receiving space 211 of the main body 21. The fluid 28 flows into the receiving space 211 of the main body 21 via the inlet 212 during the movable magnetic plunger 24 moving backward and is pressed by the movable magnetic plunger 24 to flow out via the outlet 213 during the movable magnetic plunger 24 moving forward. Because the fluid 28 directly moves through the main body 21 to be separated from the electric apparatus completely, it is possible to prevent the fluid 28 from contacting with electricity and occurring conductive effect.

While the invention has been described with referencing to preferred embodiments thereof, it is to be understood that modifications or variations may be easily made without departing from the spirit of this invention, which is defined by the appended claims.